

THE **Engineering Strategic Plan**



Our role in programmatic success at Lawrence Livermore National Laboratory

ENGINEERING'S ROLE IN A CHANGING WORLD— A MESSAGE FROM THE ASSOCIATE DIRECTOR FOR ENGINEERING



Changes in today's world are being profoundly felt at Lawrence Livermore. Research and development budgets have declined. But the world economy is still growing, fueled and dependent, to a large extent, by scientific and technological innovations. This creates opportunities that the Laboratory can capitalize on, particularly because private research and development long-term investments have been declining. However, because business is changing faster and less predictably than ever before, the Laboratory and Engineering need to develop an unparalleled degree of flexibility to make the most of these opportunities.

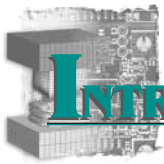
My first priority since coming to Livermore has been to understand how flexibility can play a more important role in the way we do business. This flexibility can ultimately be achieved by becoming technically more agile, as well as operationally more effective. I have also been particularly interested in developing a better understanding of what unique strengths the Laboratory and Engineering may have, and how they can support each other in a positive way. Through this, it has become apparent that it is Engineering's people and its core technologies that have the power to distinguish it not only as a strong organization, but also to differentiate it in being able to provide unique and relevant assets. It is these assets that we shall rely on to help the Laboratory prosper.

This strategic plan incorporates these strengths and addresses the changes that will be required to exploit a changing Lab and a changing world. This plan also commits us to make programs succeed by developing the people and cutting-edge technologies that will allow programmatic growth and future success. The plan is the result of many months of work by Engineering management and employees to ensure that it is institutionally relevant. When fully implemented, it will enable Engineering to be in the unique position of providing the growth engine for Lawrence Livermore and helping it to become indisputably the very best research and development facility in the world. It is the initial step in an effort to define the business practice of Engineering that will enable us to build a flexible organization with a more clearly focused role.

I look forward to working with you to make this strategic plan a reality.

A stylized, handwritten signature in black ink, appearing to read 'S. Dimolitsas'.

Spiros Dimolitsas



INTRODUCTION

The nation faces new challenges, but the need for the national laboratories remains. Lawrence Livermore is applying its skills to pressing national and global challenges, focusing on areas of long-term importance that require world-class technologies, and where its contributions are unique and valuable. Specifically, the Laboratory will capitalize on its national-security expertise to provide science-based solutions to vital global security issues, as well as global ecology and bioscience problems.

The Laboratory will address this mission and build a sustainable differential advantage through multidisciplinary research that requires unique knowledge or facilities, involves significant technical challenges, is breakthrough in nature, and creatively fuses world-class science with technology to provide complete, integrated solutions. Its accomplishments must be achieved in an environment where political developments increasingly result in frequent, unpredictable, and substantial changes in mission objectives, and national budget deficits continue to fuel competition for limited research and development funding.

Businesses generally adopt one of three strategies to successfully stay ahead of competition. These strategies are:

- Overall cost leadership—achieving lowest cost relative to competitors.
- Differentiation—distinguishing oneself by a set of products or services, thereby creating something industry-wide that is perceived as being unique.
- Focus—concentrating on achieving the needs of a particular narrow segment of the market.

Here we outline how Engineering will adopt a competitive strategy based primarily on differentiation. We will differentiate ourselves with a robust technology base, resource flexibility, and a central role in every major program deliverable.

In developing the specifics of our strategic plan, we first examine Engineering's strengths, which are key to deriving our vision and mission. We detail our core values that will serve to guide our actions, and then outline our strategic objectives and specific strategies and actions. Finally, we discuss the plan's implementation.



STRENGTHS

Many of Engineering's strengths are unique to Livermore and not found within other laboratories in the DOE complex. Some of our strengths arise from the matrix system, some from the capabilities the Laboratory has chosen to specialize in, and some from our history and geography.

These strengths include—

- People with a diverse mix of skills that include project management experience and the ability to become integral to the program they support.
- Ability to move people rapidly from program to program to provide the Laboratory with the resource flexibility to fulfill its mission.
- A robust and diverse technology base, with Laboratory institutional support for directing funds to further develop technologies.
- Accessibility to world-class and unique facilities.
- Participation in multiple programs, with ready accessibility to a multidisciplinary scientific base.
- Ability to interface with industrial partners.
- Proximity to high-tech industry.
- Accessibility to a preeminent higher education system including the University of California and Stanford University.



It is our vision to be the growth engine for Lawrence Livermore and to help it become indisputably the very best research and development organization in the world.

Engineering is at the center of nearly every programmatic project. This gives us a cross-cutting view of issues and technologies that can be exploited to stimulate Laboratory growth. We can create innovative solutions to new problems and

facilitate multi-directorate synergies. We will use the matrix system to move not only people, but also technology, across the Laboratory.

Further, Engineering can capitalize on its functional placement between science and the marketplace to help the Laboratory become fully recognized for its science and technology base. One way we can accomplish this is to promote ventures with other laboratories and high-tech industry in California that will create substantial regional growth.



It is our mission to make Lawrence Livermore programs succeed,

and we accomplish this by

developing the people and cutting-edge technologies necessary to foster programmatic growth and future success.

Through these coordinated actions, we

provide unique, world-class engineering resources that enable Laboratory directorates to translate their objectives into physical deliverables on time, within budget, and to specifications.



Engineering will succeed only through the efforts of its people. The success of these efforts is a function of the beliefs and values that are at the core of our behavior. These core values define our culture and guide our actions.

- Integrity—in all we do
- Quality—excellence, value, and total customer satisfaction
- Innovation—in our processes and our products
- Teamwork—to achieve more than the sum of individual contributions
- Respect—for each other, our diversity, our communities, and our environment
- Safety—throughout.



STRATEGIC OBJECTIVES

Our mission can be translated to a set of specific, strategic objectives that Engineering will pursue based on technology differentiation and organizational flexibility. These strategic objectives include:

- Becoming increasingly accountable for programmatic success by providing Laboratory directorates with the appropriate technical services, equipment, and people to ensure success in every phase of any project. We will provide the best solutions possible in terms of quality, cost, and schedule, enabling Engineering to be a full-service, one-stop organization for our customers, the Laboratory programs. We will outsource for technical services when it best serves our customers' needs.
 - Fostering the unique science-based technologies that will make a substantial difference in the Laboratory's ability to initiate and execute the programs of tomorrow. This requires that we develop a portfolio of technologies that enable program success, and that such a portfolio must contain technologies (our products) that are:
 - Unique (otherwise, why choose us?)
 - The best (otherwise they don't belong in a national lab)
 - Relevant (there is a program that needs them)
 - Brought into being in a timely fashion.
- Furthermore, because our "unique products" provide the basis for our differentiation strategy, and thus the basis for our future revenues, we must become increasingly vigilant of when to invest in them and when to divest them. It also requires us to serve external customers directly, when appropriate, to proactively foster our core technologies, as well as to develop the people through which these technologies are ultimately embodied.
- Contributing to Laboratory organizational agility by ensuring that Engineering is technically diverse, productive, cost effective, and capable of frictionless movement of people and resources.
 - Generating business growth by technical knowledge fusion and diffusion. Engineering's size and central role in the Laboratory gives it a unique cross-cutting view of the intersections of problems and technologies. This can be exploited to create innovative solutions to new problems, thus helping Lawrence Livermore grow through an expanding customer base.
 - Fostering Laboratory synergism by serving as an integrating thread through programs and promoting multidisciplinary collaborations.
 - Enhancing Laboratory visibility by supporting external collaborations. We can capitalize on our functional placement between science and the marketplace to gain greater external recognition.
 - Planning for optimal solutions that put the Laboratory's interests ahead of Engineering's. It makes no sense to seek solutions that benefit Engineering but are disadvantageous to Lawrence Livermore as a whole.



STRATEGIES AND ACTIONS

We have identified six strategies and a number of action items to support Engineering's strategic objectives.

Strategy #1—Core Technologies

Invest in core technologies crucial to the support of Lawrence Livermore's mission and core competencies.

The purpose of this strategy is to support Engineering's differentiation by proactively identifying the core technologies to invest in using a predefined set of investment and divestment criteria. These criteria must include quality, uniqueness, and relevance to Laboratory programs and core competencies.

Core technologies are defined as distinct, focused technical strengths. For example, nondestructive evaluation is an Engineering core technology.

Core competencies are the collective learning of an organization that enables it to coordinate diverse skills and integrate technologies. For example, lasers and electro-optics and nuclear science and technology are two of Lawrence Livermore's core competencies.

Action Items

- Identify Engineering's current core technologies.
- In conjunction with our customers, chart current core technologies in accordance with current and projected Laboratory core competencies.
- Periodically modify the core technologies we invest in to match Laboratory competencies.
- Define mechanisms for core technology management, including development of technology plans.

Strategy #2—Business Development

Acquire the financial resources necessary to proactively develop core technologies that are required for programs to be successful in the future.

This strategy's purpose is to finance the growth of required core technologies through external business development.

Action Items

- Define potential business areas that can benefit our core technologies.
- Analyze the market and competition and establish clear criteria for competing using sustainable differential advantages.
- Establish alliances both internally and externally to pursue business development.

- Develop a business and marketing plan that clearly articulates the expected benefits to the Laboratory.
- Establish coordinated marketing skills within our technical staff and create mechanisms to systematically identify and develop business opportunities.

Strategy #3—Customer Interactions

Develop full partnerships between Engineering and each customer to facilitate breakthrough scientific and technical solutions.

The strategy ensures that Engineering activities foster customer collaborations for the greater good of Lawrence Livermore.

Action Items

- Continuously improve each customer relationship by tailoring staffing, services, and core technologies to customer needs.
- Proactively partner with customers for the development of Laboratory programs and initiatives.

Strategy #4—Cost Effectiveness

Continuously increase value to customers by managing costs.

This strategy serves to enhance operational flexibility through improvements in organizational efficiency and shifts of resources to activities that provide greater alignment to our mission.

Action Items

- Close unnecessary or underutilized facilities and consolidate redundant ones.
- Analyze the cost-benefit of our organizational functions and eliminate high-cost but low-benefit activities.
- Simplify Engineering management and business practices and procedures.
- Align the organization to the pursuit of shared objectives and communicate, in a timely fashion, changing organizational priorities.

Strategy #5—Leadership Development

Develop decisive, flexible, and skilled leaders across Engineering for future programmatic, functional, and institutional roles.

The purpose here is to identify and develop the people to define, shape, and manage Engineering's role in an ever-changing environment.

Action Items

- Define and document leadership criteria and expectations.
- Create and communicate a system of ongoing development for Engineering leaders, including ongoing training for all people in leadership roles, use of institutional and off-site assignments, and our mentoring program.
- Evaluate leader performance by piloting a comprehensive feedback process that gathers input from a leader's subordinates and peers as well as from superiors and customers.

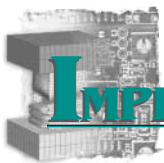
Strategy #6—Workforce

Foster a high-caliber, customer-focused workforce.

The strategy enables us to produce a workforce with the skills necessary to implement our mission. To do so, the workforce must be operationally flexible, technically agile, and committed to our mission. This, in turn, requires recruiting a diverse, high-caliber workforce, rewarding high performers, and eliminating all incentives for low performance.

Action Items

- Define, in practical terms, a "customer-focused" workforce.
- Develop and implement a more aggressive performance management system to reward high performance and eliminate low performance.
- Develop and implement a reward system that is fully consistent with the strategic plan.
- Continuously assess and adjust workforce skill mix to match evolving customer needs.
- Develop processes that facilitate the movement of people throughout the Laboratory.
- Hire and retain the best and brightest.
- Expand career development activities to strengthen workforce diversity at all levels.



IMPLEMENTING THE PLAN

A measure of a strategic plan's worth is the willingness and ability of an organization to implement that plan spontaneously. Before our plan was finalized, work had already begun on facility reconfiguration. Now work begins in earnest to address issues that are of greatest importance to the organization, including technology and facility investments, organizational structure, moving

money from low- to high-priority uses, and linking our performance to program success. We will use this plan to define our actions and shape the way we make decisions and measure performance. The success of this plan and Engineering requires our collective commitment to pursue our mission and to build a diverse environment in which all individuals can attain their fullest potential.

Engineering Directorate

OUR VISION

*To be the growth engine for Lawrence Livermore
and to help it become indisputably the very best
research and development organization in the world.*

OUR MISSION

*To make Lawrence Livermore programs succeed by
developing the people and cutting-edge technologies
necessary to foster programmatic growth and future success.*

OUR CORE VALUES

Integrity—in all we do

Quality—excellence, value, and total customer satisfaction

Innovation— in our processes and our products

Teamwork—to achieve more than the sum of individual contributions

**Respect—for each other, our diversity, our communities,
and our environment**

Safety—throughout

These core values guide our actions.